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# AVIATION AND AERONAUTICAL ENGINEERING



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VOLUME V  
Number 3

## SPECIAL FEATURE

The Complete Text of the Senate  
Report on the Aircraft Situation

Two  
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PUBLISHED SEMI-MONTHLY  
BY  
THE GARDNER-MOFFAT CO., INC.  
120 WEST 32nd ST. NEW YORK

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# AIRCRAFT

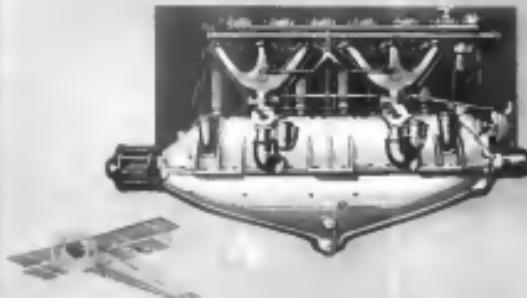


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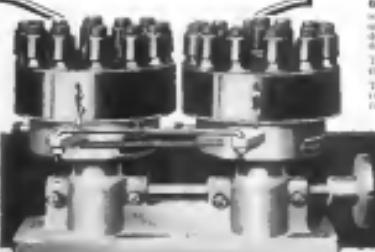
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It has been highly recommended for the manufacture of delicate measuring instruments because of its indifference to ozone and freedom of formation of acid sulphur compounds on its surface.

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The smooth, beautiful finish of Bakelite is lasting, as it will not bloom, swell or deteriorate with age and remains unaffected by water, oil or solvents."

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"Whenever we have had a bearing at some vital point and wanted to forget about the bearing once it was installed, we have never considered anything except Non-Gran."

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Our booklet "A" will give you valuable information on this subject.

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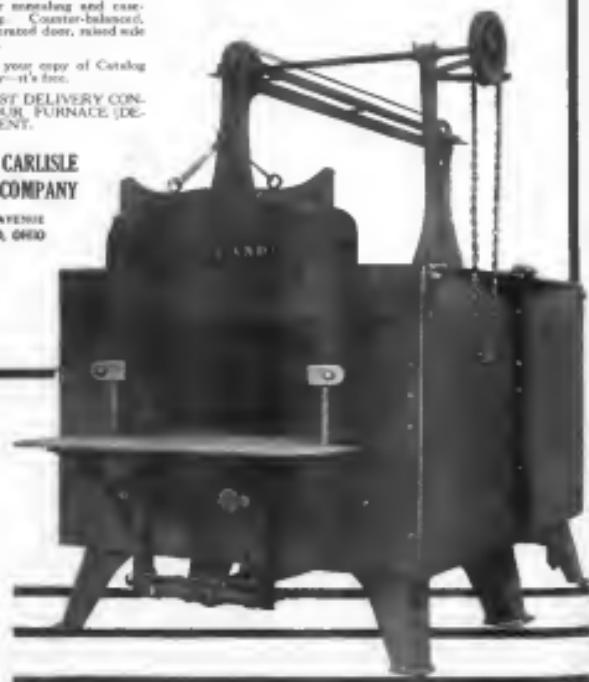
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SEPTEMBER 1, 1918

# AVIATION AND AERONAUTICAL ENGINEERING

VOL. V. NO. 3

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# AVIATION AND AERONAUTICAL ENGINEERING

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ASSISTANT EDITOR

Vol. 1

September 1, 1921

No. 1

## Aircraft Production in the United States

*Report of the Sub-Committee to the Senate Committee on Military Affairs*

After having been engaged in another investigation of a phase of the aircraft situation since the first part of June, the report of the sub-Committee on Military Affairs headed by Senator Thomas was submitted to the Senate on Aug. 22. Other members were Senators Reed (Mo.), Smith (Ga.), Nease (Ind.) and Pringle (N. J.). The committee has found much to condemn, and some things to称赞, and has not hesitated at favorable or unfavorable criticism whenever it seemed to them to be deserved.

On the other hand, the report includes little which is really new, except in some added detail.

In recognition of the creation of an independent Air Service, with a seat on the Cabinet, a study to stress expansion, but there are other recommendations which are acknowledged valuable on their face and will be less disputed.

### Salient Features

Among the salient features and recommendations are the following:

A substantial part of the \$440,000,000 appropriation was preventively wasted.

Up to date only 67 of 600 American-made DH-4s have been received by the battle front.

Tests of forty DH-4s passed them structurally weak and defective. These are to be replaced with a De Havilland type of later design.

Contractors were let for 8,200 DH-4s, upon which work was stopped until numerous defects in design and workmanship could be remedied.

Over \$650,000 has been expended on the Bristol fighter which was then condemned and its production discontinued.

After more than 3,000 Standard J training machines at a total cost of \$6,000,000 had been produced, they were condemned and stored.

An order for 3,000 Spad chasseurs was subsequently canceled on the ground of obsolescence, yet afterward a contract was placed for 1,000 equivalents, and this industry is now buying every French Spad it can secure.

This contract was canceled because the Aircraft Board desired to equip the Spads with the Liberty 8, which was not practicable. At about the time the Liberty 8 itself was discarded,

Only SE 5's and Handley Page machines can be put in quantity production before 1919.

### Airplane Contracts

A contract placed for 200 Caprons was not carried out, because the manufacturer could not obtain the necessary iron. It was canceled later, and a contract for the Bristol fighter was substituted.

Only one experimental Caproni bombing plane, equipped with Liberty engines, has been built in this country, although the necessary data and facilities have been available since October, 1917.

Plans for the Handley-Page bombers were ready last summer but a sample plane was not completed until a year later.

There is at the front not one American-made plane and the one American-made has a bombing plane.

The United States has neither developed nor produced a quantity successful fighting plane.

These disappointing results are ascribed to inexperience and other manufacturers who though unacquainted with maintenance problems controlled the aircraft program and subordinated it to the creation of the Liberty engine instead of concentrating on its production at the same rate with the reproduction of improved European types. Such mistakes would have largely been avoided had producers been made subordinate to one man, assisted by trained aeronautical engineers in design machines and practical them to test them.

Organization under the Aircraft Board was unscientific and inefficient, hindering production and yet sharing responsibility therfor.

Colonel Clark's and Holloman's report recommending the production of British, French and Italian planes was disregarded by the Board.

Hundreds of changes in the redesign of the Bristol fighter by Colonel Clark were made by authority of the Naval Corps without consulting him.

Americans at the front are using many antiquated machines discarded by the French eight months ago. Many of them are unsafe or unreliable.

### Liberty Engines

The Liberty 42 is too heavy and powerful for the lighter types of planes and is not yet perfected. More than 4,000 have been delivered.

The notion that the Liberty engine could be used on all sizes and types of aeroplanes was encouraged and is largely responsible for the delay in the aircraft program.

No fighting plane of American or other design has been built around the Liberty engine. Our air program will not be complete until this is accomplished.

Contemporaneous manufacture of the best foreign engines with that of the Liberty, as we are now doing, should have begun a long ago.

Manufacture of the Rolls-Royce engine by American contractors should long since have been for the American rather than for the British Government.

Inspection station of the Signal Corps functioned badly and unbalanced defensive material has found its way back to the producer.

Colonel Deeds is interested in establishing a flying field at Miami without the knowledge and sanction of the Service having charge of the work, for a rightifying venture between Dayton and Boston, and for financial interests in land at Dayton prior to negotiations for release as a flying field for the Government.

The site of William Wright Field is condemned as low and marshy.

To the civilian personnel of the Aircraft Board and its more prominent subordinates identified with industrial development in their respective communities ascribed the favoritism alleged to have been shown in the awards of contracts.

### Cross-Licensing Disapproved

Cross licensing is disapproved by the committee and is enjoined by every aeronautical authority who regards it of importance because it has entailed license agreements under protest because recommended to it by the Aircraft Board.

Under Mr. Sloan and General Knobly the license code of the former organization are being gathered with some improved conditions already apparent.

Unification of the Army and Navy air services under a common head with a seat in the Cabinet is also desired.

A commission of engineers and pilots for observation at the front and reporting regularly to the proposed new department similar to that maintained by the Allies is recommended as imperative.

Production of planes and engines in continuing quantity by the constructive activities of all responsible war corps to full capacity is the prime need of the hour.

College and university courses in aerodynamics and mechanical engineering and in training for them should be established at Government expense.

An Inventors Section of the War Department is recommended as a step in the right direction for giving prompt consideration to new devices and suggestions.

Aero protection should be extended by the Patent Office to applications for aircraft inventions.

Profits on same contracts for engines and planes are too high.

Producers should be required to bear the expense of planes and engines rejected because of defective con-

struction or materials not furnished direct by the Government.

Conspicuity and better protection against fire in all plane features is greatly recommended.

To full the report as follows:

### THE REPORT

On April 9, 1917, the United States entered the war.

On June 5, 1917, public announcement was made that a great part of 20,000 aeroplanes were about to be completed and would be delivered at the same month before an efficient army.

On July 26, 1917, Congress appropriated \$100,000,000 to carry out the aerial warfare program. The fund has been, either by an expenditure of its own, exhausted.

A further appropriation of \$60,000,000 has been passed recently.

In the opinion of the committee a substantial part of the funds appropriated has been wasted.

While much work has been accomplished, for a fact, the credit should be given, it must nevertheless be admitted that our aeronautics program has, up to the present, paralleled many aspects of history.

The cause of these war-wasted funds lies in a mass of intricate situations as follows:

(1) Six hundred and one De Havilland's have been handed the British up to August 1, 1918.

(2) Four J. 10s had reached the front by July 1.

(3) August 1, a number of 18 B.E. 2s had hardly flew over the front.

(4) December 1, a number of 18 B.E. 2s had hardly been received. Their location and whereabouts of the De Havilland's is further discussed in paragraph (1) and in the body of the report.

(5) We have just a single American-made plane (one plane) entirely built in the United States.

(6) We have and a very American-made heavy bombing plane (the Jenny).

(7) We have not developed and put in quantity production a successful class of fighting plane.

(8) Our attempt to develop the British engine, the Hispano-Suiza, was, without sufficient justification, at a standstill production, cost \$10,000,000 expended, and the lives of several officers were sacrificed, while the machine was abandoned and the investigation discontinued.

(9) The Bell Scott engine and put in quantity production. After more than \$200,000 had been expended at a cost of \$60,000,000, the machine thus prepared was condemned as dangerous and placed in storage.

(10) We have a choice of buying plane of the highest quality from France or England and we give preference to the French. More was at once begun and drawings practically completed.

On September 27, Colonel Clark and Major Fawcett left the United States for France, and it is believed that the plane could not be operated with a Liberty motor.

Colonel Sibley's suggestion was accepted, the reason given being that the small unit fighter was required as absolute. But the fact is that on May 25, 1918, a contract was let to the Curtis Company to build 1,000 single-seat fighters, and the same day the British and French governments signed a contract with the French.

In addition to this, one Government is now using space near the battle front over Spain machines it can secure from the French, but has only been able to obtain about 450 of these.

The British, in addition to the Royal Flying Corps and the Royal Naval Air Service, have organized a force of 1,000.

Except the De Havilland's which was originally designed as a two-seat fighter and which we are equipping for reconnaissance, pilot-navigation, bombing and fighting purposes.

Contracts for \$2,000,000 were let at various times. Up to August 1, 1918, had been delivered, and a number forwarded to the front, but the delivery of the machines has been delayed.

Marksmanship, both in design and workmanship. Work upon the planes was stopped until the defects could be remedied. In

part the apparent to have been accomplished in the field, for a squadron of 18 planes has been sent across the German lines.

Up to earth as the month of October, 1917, we were in possession of the necessary facilities to construct the Cuirass, a powerful and successful heavy bombing plane, approved by British and English aeronautical engineers.

Eighteen Cuirass' were built, but upon the ground since the middle of January, yet the planes remain there to this date undisturbed except one experimental machine which is equipped with Liberty motors.

Such a result has stopped since we might have largest work among these machines and by this time have been in quantity production.

The Hispano-Pope Jenny, bombing machine, furnished smaller engine or data. Plans were issued to the Signal Corps in the summer of 1917, but were not then analyzed of engine for specific purpose until early February, 1918. Details of engine were not issued until late April and August, 1918. A sample plane ordered in March, 1918, was flown in July. To do we are not complete.

### Causes for Disappearing Results

In the opinion of the committee the disappearing results shown above are due to the following:

1. That our aeronautics program was haphazardly planned or started at the great automobile and other manufacturers, etc., who were ignorant of aeronautical problems.

2. These manufacturers, regardless of the impossible task of producing aeronautics, were compelled to produce a mass of flying machines and apparatus for the sake of the profits of flying clubs. It is not too much to say that no aeronautic program has been largely subordinate to the Liberty motor.

3. We failed at the beginning of the war to adopt the most simple means of procuring the most popular type of engine. Every engine, as far as possible, was adopted. The engine which we have now selected will be the Hispano-Suiza. This noted power has very great merits, but after a favorable type of this has been adopted.

The mistakes and errors referred to would probably have been avoided if the aeronautic board had been under the control of a single authority, and if the aeronautic engineers and producers therefrom had been free to test and experiment on their own basis, with profits to a much subordinate to them.

### No # # # # Confidential

This limit applies to a wholesale communication of our secret program. Much has been learned there are yet many things to be learned, nevertheless we are approaching a period where greater production of plane can now be had.

No # # # # Confidential

Particulars on the 25,000 war emergency, restricted to imports into the country, in aircraft production, visited a number of airmen and flying clubs and associating plants to different sections of the country. It has since been determined, however, that the majority of these firms, officers, inspectors, and others, were ignorant of aircraft construction and interested in the solution of its problems. The committee has not exhausted all sources of information, to which would require the remaining at this session, but it seems that statements and found resources upon major points of the war emergency, and the like, were not available through personal documents or official correspondence. That which may properly belongs to the Department of Justice, which, under the direction of Miss Charles E. Hughes, has been maintaining an inquiry of the over regarding that and other matters.

In directing attention to conditions, both past and present, in the service administration, your committee requests that it be given to those to negotiate, and that due attention should be made for creation of permanent, which are important to the war emergency. A new branch of the service, including the establishment of an air corps, is recommended. Our report has been an impartial of all these conditions have prevailed, and is in the same spirit that this report is made.

### The Aircraft Board

An originally composed, representative of the aeronautical industry, functioned that organization, presumably due to the

theory that aircraft engine and plane production were analogous industries. The latter was therefore submitted to the control of men skilled in automobile production. A board should be created to regulate the manufacture of aircraft engines and manufacturers for the solution of aeronautical problems. But the analogy between the two products certainly begins and ends with the fact that each uses a gasoline-air motor. Hence difficulties in design and production would tend to occur in the manufacture of aircraft engines. The first must have been demonstrated in the board through trial and experience, for Major Deedes states that in beginning the board wanted much authority with little responsibility.

"They wanted the Signal Corps to execute contracts and others wanted the board to be in an advisory capacity, and others wanted the board to be in an executive capacity. Later, when—

"They saw the result coming the board passed a resolution reaffirming the fact that they were only acting as an advisory committee."

Importation under the Aircraft Board was generally and effectively. The chief officer of the Signal Corps was the nominal head, under whose aeronautic supervision bureaus of engineering, equipment, supplies, information, production, etc., were established, many of whom have ill defined, undefined, and even no longer existing functions. The name of the service and derived from one referred to by the other could well broaden their business and serve results with diminished and efficiency. While the condition seems to be generally bad, the situation is not so bad in Washington, D. C., where the Signal Corps, having greater production, is in a position to act as the standard.

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### Aircraft Program

When Hall entered the war he made a careful study of aeronautics and the present state that then obtained. His engineers developed the British engine, the Hispano-Suiza, and subsequently put these into production under the supervision of skilled French airmen. Co-located with the engine, we began the development of airplanes on our own. At first, however, our efforts were, therefore, rapidly equipped with a quantity of British designs and of the British engine. By this means we avoided delay in production. She also promoted the development of her engineering group in employing it under previous conditions upon the terms with which she had been presented.

Upon assuming charge of aeronautics under the Aircraft Board did not adopt the previously enacted policy. The Signal Corps dispensed a committee to the front, headed by Colonel Hollings, instructed to secure all needed information, evidently for that purpose. Col. V. E. Clark, the aeronautical engineer, was placed in charge of the committee. The report, covering Col. Hollings' findings, recommended the purchase of three English, two French and one Italian plane, but the report was not honored. Designs for these and other planes were planned by the Signal Corps, or, by the inventors themselves, at their home countries, with assistance of experts and on their own initiative.

An sensible reason assigned for the board's inaction was the difficulty of translating metric into English measurements and of obtaining quantity production of foreign motors. But the board's organization, management, and use of the models and tools, could easily have been improved, and the committee could have been more effective. The board took care of the planes purchased, but it successively changed them for American production. The general purpose of the changes seems to have been to adapt them to the Liberty motor, but the inventors, in turn, could have been provided by their manufacturers, as well as in plane and engine, to assist and assist with the plans as submitted.

Finally, and in the autumn of 1917, the board adopted one French and two English types of flying planes to carry the Liberty engine. These were the Signal, the Bristol and the





uary, 1921, only 268 airplanes of all types had been delivered to the Army, sixty-four of which were made in 1920, and there were no aircraft organizations in the Signal Corps or in any other branch of the Service. The first organization was the 1st Aero Squadron, which was organized at Langley Field, Virginia, and its report was not received until September 1, 1921. But for the glowing forecast and optimistic pronouncements which the board and others made to the public from time to time regarding the future of the Service, it is difficult to imagine that the appropriations would not have been so meager and the appropriations would not have been so unbalanced, nor would the appropriations have been so widely scattered. Great Britain in 1915 and 1916 appropriated £100,000,000 for the development of its air force, and, although the results did not measure up to the expectations of the public, the appropriations were justified by experience. The board mentioned similar figures and arguments thereon by representations and assurances which were not warranted by the actual facts.

The order of the Division, creating a Military Bureau at Dublin, was issued by General Sir John French, in the appointment of General Keely and Mr. Ryan as the heads of the two divisions in an agreement upon the previous stipulations, and a condition of the conditions we have referred before, that the two heads of the two corps would be appointed by the General, and the General would be responsible for the conduct of the corps.

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3. The inspection of the finished product and other materials may be the work of General Knobly's division and may be done simultaneously with his inspection of the equipment. Work not satisfactory to General Knobly will be referred to the inspection committee as requested. Cooperation for the inspection has been had, and we hope will be observed by the heads of the two divisions and required from their subordinates. The time limit of the inspection will be determined by the general manager. The results of the inspection will be made available as soon as possible, and the results of the suggested conditions will already appear in some documents. But the system is still subject to the criticism that it is slow in character, which at present is not important, but it is slow in development and to diminish responsibility it is not concentrated. These facts, however, are the consequence of the recommendations of last April, instigated by the opinion of every man who has been more or less interested in our cause. Our present organization is far from being satisfied with our two parts with a sense of will and capacity at the head of each division. While these two divisions are consolidated, they can not be permanently co-ordinated. The two parts are too large and too diversified in size and magnitude of activities as a permanent branch of our military organization requires one direction and responsible local units both for its efficiency and safety and development. In consequence, General Knobly as a distinct area of the service is essential to the Army and

On comparative completeness at the outbreak of hostilities in 1914 a situation has become unprecedented in modern warfare. Millions arrive in no army can say "Without hope to triumph or, indeed, to escape unscathed defeat." Without excepting the most powerful, the most numerous, and the best equipped, the combatant forces of Great Britain and France each contains numbered lists of Regiments of the United States who we declared war, and ours should also be as large as those. In a destined arm of the service, Great Britain and France magnifying its war-time importance, and at its disposal, should have a regular reserve of one division, a departmental force, a corps of engineers, a corps of cavalry, a corps of engineers, every, where least, as numerous as the air, as big as an officer of the valuation, who is held responsible for efficiency of production and man's strength and an efficient force of naval fighters. We should do likewise—create a departmental air arm, a departmental army, a departmental navy, a departmental marine, with lines of the army and the Navy. We would thus place power and responsibility in the hands of a single man, responsible a service not alone for this war, but for all time, and available for the forces of the air the same policy of advances, because that has so long governed those of the land and sea.

The cost of equipment and maintenance is rapidly approaching that of the Navy, while training for aviating a plane costs as little as that for West Point and is infinite.

After the payment, the user needs

The consolidation of the department of the air would unify the services, thus removing all friction between the Army and Navy divisions of the service by subjecting both to the control of a common head. Differences between them under present conditions are unavoidable, and, while some disagreements may occur, so far, they will arise more than due to disunity, resulting in confusion through the service, besides interfering with operations.

2 A committee of engineers and pilots for observing at the front, formed an estimate and reporting in person to the department at frequent intervals, is also unquestionably demanded. The betterment of the air service requires that the service of such a committee be rapid and continuous. The committee of engineers and pilots appointed as detailed to the headquarters, and this can not be effectively done in no other manner. Similar conditions have long been manifested by our allies. This policy on this regard we will do well to adopt.

5 But some reservation finds that the private need of the machines in continuing prosperity, and the producers' desire for continued profits, are not always in opposition to all responsible concern engaged or which can be exercised as the interests to full capacity. We cannot wish the war hosts to have too many effective planes. Supremacy of one nation, a steady increase of power, may be certain weapons of aggression. War has hundreds of trivial parts waiting for planes, whose services must be performed by those producers.

Please be so kind as to have me now. Then, you should be in possession of every theory that can and will save them out, due allowances being, of course, made for other equally plausible requirements for ordnance, ships, and the like. At the same time, the Senate bill will then compensate somewhat for the discontents of the current war.

4 The rapid development during the war of the machine gun and its effective use as an important arm of the cavalry, induces us to suppose that America gives greater attention to the perfection and proliferation of methods. This should be done not only as a war measure but as a commercial and industrial necessity.

The importance of a powerful air force and an adequate heavy artillery cannot be overstated in bringing the war to a speedy and successful conclusion. With our vast resources in men material and war facilities the situation can be, by the adoption of a broad program and with the assistance of our allies, placed the complete supremacy of the air.

National leadership in science, we must give attention to the integration of our current policy. The strengths and potential assets and energies of science must be directed to the creation and implementation of new types of research and analysis that prevent present and likely enlarged. The United States should establish at Government expense college and university courses at universities and independent organizations, in addition to corporate training firms.

While quantity production is essential to the complete engagement of our armed forces, quality should not be sacrificed to quantity. The airplane requires the highest degree of skill in workmanship and the very best kind of materials. The airplane is a product of American genius, but the world for its development largely belongs to other nations. America should meet this challenge by bringing the airplane to all countries under her influence.

Business Ward Economics

B. The seventeen groups of the nation should be encouraged in the most effective way. A Bureau of Inventions, under the direction of the War Department, is a step in the right direction. A permanent commission, consisting in a large degree of men who have been long interested in inventions, particularly inventors, is to help the administration in the selection of new inventions and to give general advice and suggestions. This seems principally to have resulted from the absence of men well qualified and interested among the first authority to deal with the subject. One reason, the change of a man for a single year in office, makes it difficult to keep a permanent commission.

manufacture of small projectiles in great and urgent demand. The high cost to the Government having been now demonstrated we feel sure that future contracts will result in great saving to the Government.

and plant was granted to power a windmill which was declared unsatisfactory by those who made it last but satisfactory by those unopposed to make full use of it. The improvements of the so-called inventors brought the value of the invention to a minimum. The original idea of the inventor was new and useful can be derived from a multitude of models, the time and energy expended in discovering it and reduced in the brevity of the solution.

6. Adequate remuneration should be extended by the Patent Office

atmosphere or materials had been used by the claimant and should be at the cost of the producer. Existing agreements require payment from the claimant for every invention, presumably because they were based on the assumption that inventors are always ignorant and that their agreements will bear the expense of my inferior product, as the pretension of which however is absolutely deprived, than our invention will be the best and good successively will inevitably result.

is appropriate for persons for services relating in the public welfare and defense. This is demanded not so much for the services as for the expense. At present, and disregarded at other historical legislatures, may be necessary, to make this provision effective, but in the meantime it is suggested that the Production Board or the Commissioner of Patents engrossing the bill, in the committee of the House, or in the Senate, should add the requirement before all other provisions, thus assuring its adoption.

**B** Your committee in proposing the aeronautic plan have granted the great dangers of destruction by fire, owing to the use of gunpowder, and the necessity of making heavy protection, of antiseptic sprays and other fire protection.

The burning of any of these factors, on whale or on land, at this time would be a catastrophe, but it would greatly retard the aeronautic program.

We earnestly recommend that the requirement of the First Protection Bureau of the National Council of Defense, composed of big insurance experts, for better fire protection, as

It has been announced that the Senate Select Committee will make a special Senate report on Secretary of War Baker.

## **British Airship Development**



From *Architectural Record*

The accompanying illustration, representing a British model of the N. S. Charbonneau ball, illustrates certain features in the development of the projectiles adopted by British designers in the development of their armament. The ball is characterized by the arrangement of the armor. This is secured in position by the tenacity of the ball, that is, by the internal pressure of the gas, or encloses several metallic components.

reactions in the center of the car was being made the car by exposed racing gears, and ruptured the power plant, the S-15 has apparently a closely adherent, well streamlined body, while the power plant is mounted on an independent structure, rigid well ahead of the car. The air intake pipe leading from the nose is short, the box is rounded, and the air passing around

The discussed and after hibernation are clearly visible in this migration, as are the hibernating bags filled in the case of the *er* and the *er* cases mentioned individually the original structures. The symmetrical shape of the red phases is also worth noticing.

consequently at time  $t$  it is no longer to be independently generated by the same signal strengths. On the other hand, the maximum of the power plot in the immediate neighbourhood of the half-swing frequency shows that British assembly designators have little fear of constrictions from this source, which is probably passed against a fairly low-light failure and allowed random collection.





most either in regard to the machines themselves or their control by the pilot.

It seems thoroughly probable that we have not, and that some time in the future we will not, reach a stage where one man is more effective in the matter of this double and overwhelming function of control, and simpler in its relation to the pilot.

There still remains two large and important fields, each in separate problems. These are armament and instruments. I shall allude no more than the broadest general reference to these two classes of problems.

These emerge under the head of armament, of course, strictly military in character, and but little of interest could, as yet exist, be used in a public address. Such problems relate to the use of the type and size of gun, to the use of aerial shells, mines, and aerial bombs, torpedoes and devices for carrying, storing, dropping, or, if possible, of armor and protection of vital parts against gasoline or shotgun karat, etc.

Expressed in these most general terms, these problems require the closest study, and it is for this reason that the requirements imposed by the designer, safety factor of 10, and to adaptives to singularities upon the devices and designs of the enemy in the same field.

Regarding instruments, with some specific can be said. This may be done in a general way, and in a public address, but in the moment, and now, with knowledge has best effect. It is interesting to note the change in which the modern airplane has become a flying laboratory and technical laboratory. Thus, a recent list of airplane instruments shows some 25 or 30 different instruments, devices, and tools made to be carried in an airplane, but all made to the greatest accuracy, and to be of great precision, and each having some specific, important purpose.

## Desirable Aeronautical Inventions

The Invention Committee of the British Aero Ministry has issued a memorandum on desirable aeronautical inventions and improvements which should be of considerable value.

Essentially speaking, and as at the present time of the war is concerned, no very startling change in the present types of aircraft is expected, although improvements in parts and also in details are always possible and may produce very important results.

The stage of development in construction which has now been reached is such that major improvements can only be expected from those points of the respective aeroplane and motor which are not yet fully developed. Small and gradual changes in the shape of wings, empennages, the body, and the aerofoils are only possible after long and patient research carried out in aeronautical laboratories.

*Motors.*—Aeroplane, gas-turbines, and diesels.—Aero, many and varied are the present proposals for aero engines. The result of this effort which, if all efficient designs can be produced, would possess certain advantages, though probably not so great as was once imagined. Others have suggested flying wings and rotary planes.

With these, however, goes very little promise of being developed for air during the war, and in any case would require many years of experiment before they could be regarded as practical proposals.

*Motor Deviations.*—As regards motor improvements, inventors should not be afraid that many details such as the following are not yet understood, and a certain degree would only be justified by some very marked superiority.

*Safety Devices.*—Safety devices for preventing crashing of the machine and the pilot form a numerous class. The chief of these is the parachute, often spoken of as heretofore to the pilot as a safety belt, and not a safety device. There has also been a parapente dropped by a parachute from an aeroplane under which a parapente may have to be used as a safety apparatus. Then the machine may be of control, dropping and landing at 100 to 200 miles per hour, or spinous movements in flight.

Many other safety devices, such as aerofoil stabilizers, windshields, etc., have been proposed at various times. The additional weight entailed by the use of any of the suggested safety apparatus must mean a very serious factor for so heavy a machine as a propeller.

*Aerofoil Problems.*—The aerofoil is the heart of the airplane, and on its reliability depends the safety of the pilot. Persons acquainted only with motor-car engine practice sometimes do

with those aeronautics, as with armament, the problem lies themselves in an effort to meet the military or the aeronautical and operative requirements of the situation, and in the days when, as at present, a manufacturer or engineer is apt to be asked to design a device, he may be compelled to do so.

Most of the work relating to these problems under armament and instruments is already done and well done. The last remains, however, main problems, especially of detail and improvement, and these must be considered an outstanding field of research.

By way of conclusion, reference may, for a moment, be made to a position of the most total and far-reaching economic importance, and which will be open with the arrival of the next world war. This is the problem of the best economic utilization of the resources of the earth, and how best to utilize the aeronautical products, expressed in terms of means and human time and energy, and now represented by radios, machinery and equipment, finished products, refined industrial organizations, learned staffs and production experts.

For this purpose, the author, and I hope you may accept my fervent suggestion for the entire Army, I can do more than mention it here by name. We can, however, scarcely over-emphasize its importance, and the appointment of expert committees, such as the Wrights did to the United States Government, and the Royal Engineers did to the British Government, to the problems involved in the use of the earth's resources, that their certain import is appreciated, and we can hopefully avoid costly mistakes of adjustment against the day when we may again turn our thoughts to the operations of peace.

As an aside, let me add, that in so far as we can only look hopefully forward, it is better to give to us such measures of aeronautics as our patience and study may merit.



## The Air Mail Service

The Air Mail Service, which the Post Office Department announced on the New York Philadelphia Washington route on May 15, was operated by Army aviators, delayed due to weather, and suspended on Aug. 15, 1928. At the time of its suspension, it was the Post Office Department's opinion that it was not a partial monopoly, existing at College Park Field, was maintained at the Washington terminal of the air mail route.

Concurrent with the transfer of the air mail service, six additional aviators, a staff of twelve mechanics, and agents engaged upon the discharge of their duties, in supplement of the detailed military personnel, under orders of Capt. E. B. Lepeske, appointed on July 15 superintendent of the Army Mail Division of the Post Office Department.

On Aug. 15, the Postmaster-General issued a circular to Capt. Lepeske when the latter was in charge of the air mail service, resigning his commission as a Army, to accept from the Postmaster-General his new appointment. He is a recognized authority in transportation and mechanical management, and has been connected with the Post Office Department since 1918.

The postal authorities who will carry the mail on the Washington New York route are expert civilian drivers and mechanics to station. The last commander Max Miller, former flying instructor at San Diego, Cal., 1800 hours in the air, Maurice A. Brown, Brooklyn, N. Y., experienced pilot and mechanic, 1100 hours in the air; Robert Shantz, military flying instructor,

1800 hours; and the residue are as follows:

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# Gillette SAFETY RAZOR



## War service is throwing the spotlight on the Gillette

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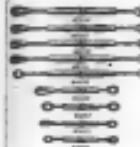


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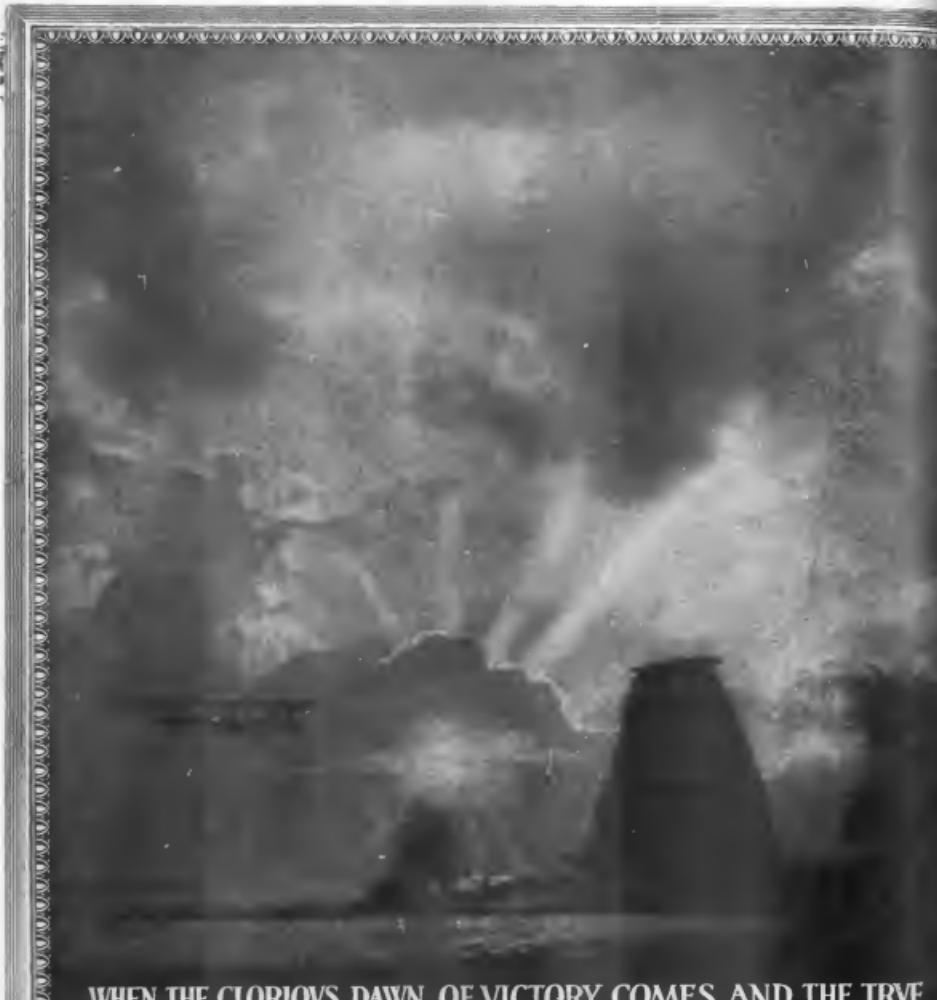
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